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PRE-APPEAL BRIEF REQUEST FOR REVIEW		Docket Number (Optional) 62251.000003
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	First Named Inventor Raymond J. GORTE	
	Art Unit 1745	Examiner Dah-Wei D. Yuan

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

- applicant/inventor.
 assignee of record of the entire interest.
 See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
 (Form PTO/SB/96)
 attorney or agent of record.
 Registration number 35,022
- attorney or agent acting under 37 CFR 1.34.
 Registration number if acting under 37 CFR 1.34 _____


 Signature
Patrick A. Doody
 Typed or printed name
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 Telephone number
4-18-06
 Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required.
 Submit multiple forms if more than one signature is required, see below*.

*Total of _____ forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of :)
Raymond J. GORTE, *et al.*) Examiner: Dah-Wei D. Yuan
Serial No.: 10/053,085) Group Art Unit: 1745
Filed: November 9, 2001) Confirmation No: 5527
)
For: USE OF SULFUR-CONTAINING FUELS FOR
DIRECT-OXIDATION FUEL CELLS

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

The final Office Action ("the Action") dated December 19, 2005, rejects pending claims 1-30 and 54 of application No. 10/053,085 ("the present application"). Applicants respectfully request that an appeal conference be held to review the following matters in regards to the present application.

Applicants' remarks can be found on pages 2-5, and are thus provided in five (5) pages or less, as suggested by the OG Notice of July 12, 2005.

Before addressing the merits of the rejections set forth in the Action, applicants believe that the finality of the Office Action is premature because the newly cited reference, Mogensen *et al.*, US Patent No. 5,350,641 (hereinafter, "Mogensen"), was more relevant to the claims prior to the amendment. Accordingly, the amendment could not have caused the Examiner to cite Mogensen.

I. THE PRESENT CLAIMS ARE NOVEL

Claims 1, 15, 18, 20, 30, and 54 have been newly rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Mogensen. The present claims specifically recite: "wherein like particles of the ceramic-metal composite anode and the solid electrolyte are fused together." The Action fails to address this element of the claims, presumably because Mogensen does not teach a solid oxide fuel cell wherein the like particles of the ceramic-metal composite anode and the solid electrolyte are

the like particles of the ceramic-metal composite anode and the solid electrolyte are fused together. Instead, Mogensen teaches precisely the opposite by requiring a special coating to avoid any fusion or bonding between the anode and the electrolyte. The following passages from Mogensen is particularly instructive:

A solid state fuel cell of the above type is according to the invention characterized in that a thin layer of CeO₂-based ceramics is fastened to the electrolyte and serves as an anode, a surfactive metal oxide also being applied between the electrolyte and the ceramic layer.

By adding NiO or another transition metal oxide which is surfactive on YSZ to the CeO₂, CeO₂ is prevented from diffusing into YSZ. Alternatively, a layer of such a metal oxide powder suspended in a dispersion medium can be painted on the YSZ electrolyte followed by application of the CeO₂ powder. By the expression surfactive is meant that the metal oxide, such as MnO₂ or NiO, is easy to distribute uniformly on the YSZ surface as well as that the oxide does not clot in spots on the YSZ surface during the heating process. The measure can alternatively be performed by admixing up to 30% by weight of NiO into the CeO₂-based ceramic powder. It is assumed, that a very low content of NiO suffices. Alternatively, assumed suitable auxiliary oxides are oxides of the transition metals V, Cr, Mn, Fe, Co, Cu, Zn, Nb, Ta and of Ca, Ge, In, Sn, Sb, Pb, and Bi.

Mogensen, column 2, lines 14-18 (emphasis added). Mogensen therefore avoids fusion, whereas the present claims require fusion.¹ Applicants respectfully request withdrawal of this rejection.

II. THE PRESENT CLAIMS WOULD NOT HAVE BEEN OBVIOUS

A. Both Mogensen and Anumakonda Fail to Teach or Suggest All Claim Limitations

The Action sets forth a new rejection under 35 U.S.C. § 103(a), rejecting claims 2-6, 9-14, 21-27 as unpatentable over Mogensen in view of Anumakonda *et al.*, US Patent No. 6,221,280 (“Anumakonda”). To establish a *prima facie* case of obviousness for a claimed invention, the cited references must teach or suggest all the claim limitations. See MPEP §§ 2143 and 2143.03. Here, the references, alone or in combination, fail to teach a solid oxide fuel cell comprising a ceramic-metal composite anode containing at least ceria, and a cathode, at least the solid electrolyte and anode being prepared to form a porous anode layer and a dense solid

¹ The “fusion” described in the Background section of Mogensen (col. 1, lines 54 to col. 2, line 2) and relied upon by the Examiner to support the rejection, is avoided by Mogensen’s invention. This “fusion” is actually diffusion of CeO₂ and YSZ into one another, and consequently, would not be “fusion” between “like materials” as required in the present claims (e.g., between the YSZ in the anode and the YSZ in the electrolyte).

electrolyte layer wherein like particles of the ceramic-metal composite anode and the solid electrolyte are fused together.

As presented above in response to the anticipation rejection, the primary reference Mogensen does not teach a solid oxide fuel cell wherein the like particles of the ceramic-metal composite anode and the solid electrolyte are fused together. Mogensen fails to disclose or suggest this feature of the claimed invention, and indeed, seeks to avoid fusion by applying a surfactive metal oxide between the electrolyte and the ceramic anode material. Thus, Mogensen actually teaches away from like particles of the ceramic-metal composite anode and the solid electrolyte being fused together. A reference that teaches away from the claimed invention cannot render the claimed invention obvious (it is the antithesis of obviousness). See, e.g., *Dow Chemical Co. v. American Cyanamid Co.*, 2 USPQ2d 1350 (Fed. Cir. 1897); MPEP §§ 2145(X)(D)(1). Accordingly, any obviousness rejection of the present claims based on Mogensen is improper.

Anumakonda fails to cure the deficiencies of Mogensen. Accordingly, the combination of the Mogensen and Anumakonda fails to render obvious the present claims.

The deficiencies of Anumakonda's teachings are well documented in the record. In sum, Anumakonda fails to teach a solid oxide fuel cell comprising a sulfur-containing hydrocarbon fuel. Indeed, Anumakonda teaches directly away from this aspect of the invention by requiring reformation of the fuel by use of a catalytic partial oxidation process to yield hydrogen and carbon monoxide, and then introduction of the hydrogen to the solid oxide fuel cell. Thus, Anumakonda discloses at best a solid oxide fuel cell containing hydrogen, not a sulfur-containing hydrocarbon fuel, as the fuel source. Applicants note that the claims recite a solid oxide fuel cell that contains a sulfur-containing fuel, which is directly contrary to Anumakonda's teachings. Again, a reference that teaches away from the claimed invention cannot render the claimed invention unpatentably obvious. See, e.g., *Dow Chemical Co. v. American Cyanamid Co.*, 2 USPQ2d 1350 (Fed. Cir. 1897); MPEP §§ 2145(X)(D)(1).

The Action alleges that it would have been obvious to combine the references because Anumakonda teach the processing and use of a sulfur-containing hydrocarbon fuel ***to simplify the overall design of the solid oxide fuel cell system.*** This appears to be the motivation relied upon by the Examiner to combine the teachings. Anumakonda does not simplify the design, but rather complicates the

design of Mogensen's fuel cell system by requiring unit operations prior to the fuel cell.

The Background of the Invention section of the present application discloses various proposals to replace hydrogen with commercially available and more economical hydrocarbon fuels, but states that such raw fuels "are not currently in use as a fuel source suitable for a fuel cell because these fuel cells contain relatively high levels of sulfur" (page 2, lines 19-23). The prior art attempted to solve this problem by utilizing various methods of reforming the sulfur-containing fuels into hydrogen gas, as disclosed on pages 3 and 4 of the specification. Anumakonda, *et al.*, U.S. Patent No. 6,221,280 ("Anumakonda") describes yet another mechanism of reforming sulfur-containing fuels into hydrogen gas and carbon monoxide, *prior to* feeding the hydrogen gas to a solid oxide fuel cell. Anumakonda's teaching therefore results in a more complicated design, which would motivate a person skilled in the art NOT to combine it with Mogensen.

Even assuming as true the allegations in the Office Action regarding Anumakonda's reaction system providing "a simplified overall system design," the system that is simplified is a system used to reform sulfur-containing hydrocarbons. This is Anumakonda's contribution to the prior art — an alleged simplified sulfur removal process, and not a simplified fuel cell. Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

B. Dependent Claims 16, 17, and 19 are Nonobvious over Mogensen

The Action sets forth a new rejection under 35 U.S.C. § 103(a), rejecting claims 16, 17, and 19 as unpatentable over Mogensen. Applicants respectfully submit that the Office Action fails to establish a *prima facie* case of obviousness. As stated above, Mogensen fails to teach or suggest all of the elements of the present claims, and actually teaches away from the present invention. Accordingly, any obviousness rejection of the present claims based on Mogensen would be misplaced. Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

C. Dependent Claims 7, 8, 28, and 29 are Nonobvious over Mogensen and Anumakonda

The Action sets forth a new rejection under 35 U.S.C. § 103(a), rejecting claims 7, 8, 28, and 29 as unpatentable over Mogensen. Applicants respectfully

submit that the Office Action fails to establish a *prima facie* case of obviousness. As stated above, Mogensen and Anumakonda fail to teach or suggest all of the elements of the present claims and actually teach away from the present invention. Accordingly, any obviousness rejection of the present claims based on Mogensen or Anumakonda would be misplaced.

III. CONCLUSION

In view of the foregoing, applicants respectfully submit that the present claims are in condition for allowance. An early notice to this effect is earnestly solicited. Should there be any questions concerning this response, Examiner Yuan is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

7-19-06

Date



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